Fig. 1

14   11   13   15

TEXT
DATA → | TEXT ANALYZER | → | SPEECH SYNTHESIZER | → | SYNTHESIZED SPEECH |

| FACIAL CHARACTER READING ASSIGNMENT UNIT | ～12

OVERALL CONFIGURATION OF TEXT TO SPEECH SYNTHESIZER

Fig. 2

| TEXT BUFFER | 31

24
TEXT DATA →

| 21 FACIAL CHARACTER DETERMINING UNIT | 26 OUTLINE POSITION DATA | 22 CHARACTERISTIC EXTRACTION UNIT | 28 READING NUMBER & OUTLINE POSITION DATA | 23 READING SELECTION UNIT | 30 READING & FACIAL CHARACTER POSITION DATA |

25 OUTLINE SYMBOL TABLE

27 CHARACTERISTIC SYMBOL TABLE

29 READING TABLE
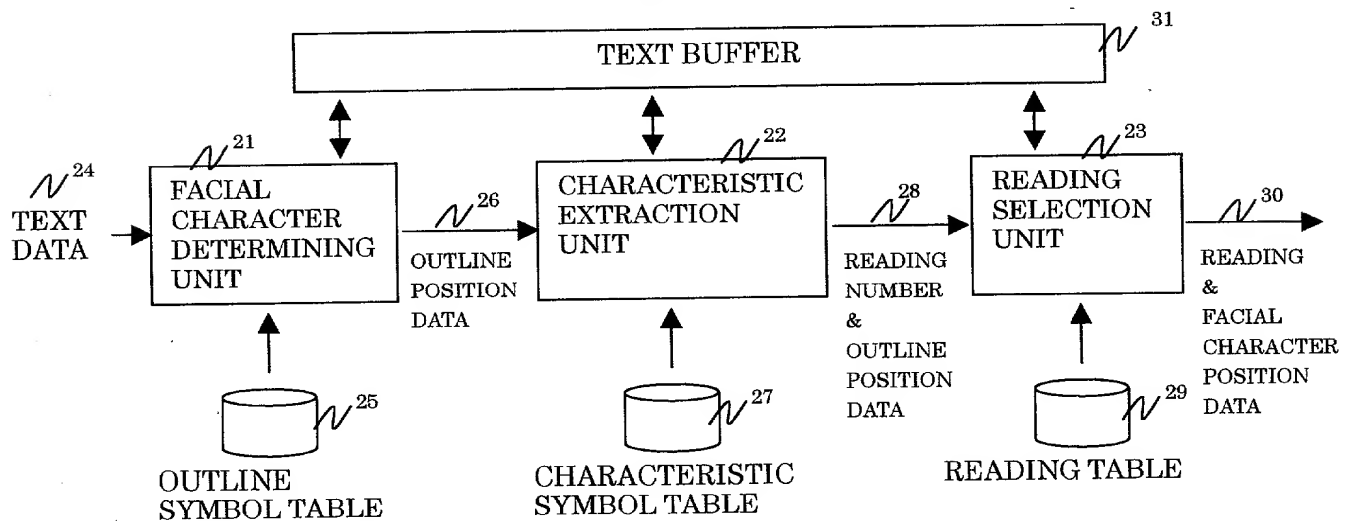
CONFIGURATION OF THE FACIAL CHARACTER READING ASSIGNMENT UNIT OF THE FIRST EMBODIMENT

Fig.3

Left flowchart:

(S)

S1: SET SCANNING POINTER p TO LEFT END OF INPUT TEXT

S2: p REACHED END OF TEXT? — YES → (E2)

NO

S3: IS p LEFT OUTLINE CHARACTER? — YES

No

S4: ADVANCE SCANNING POINTER p BY ONE CHARACTER

S5: SET COUNTER cnt TO 0

S6: COPY CURRENT p TO ps → (1)

Right flowchart:

(1)

S7: ADVANCE SCANNING POINTER p BY L CHARACTER PORTION

S8: ADVANCE POINTER p BY ONE CHARACTER PORTION

S9: ADD 1 TO COUNTER cnt

S10: p REACHED END OF TEXT? — YES → (E2) S14

NO

S11: cnt LESS THAN OR EQUAL TO THRESHOLD K? — YES → (E2) S14

NO

S12: p RIGHT OUTLINE CHARACTER? — YES

NO

S13: COPY CURRENT p TO pe? → (E1)

FLOW OF PROCESSING FOR FACIAL CHARACTER DETERMINING UNIT

S

SET READING NUMBER N TO 0   S21

SET SCANNING POINTER p TO ps   S22

p REACHED pe ?   S23   YES → E

NO

CURRENT CHARACTER IN CHARACTERISTIC SYMBOL TABLE?   S24   YES →

NO

N = 0?   S26   YES → SET CHARACTERISTIC NUMBER TO N   S27

NO

INCREMENT NUMBER OF APPEARANCES OF CHARACTERISTIC BY 1   S28

IS NUMBER OF APPEARANCES OF CHARACTERISTIC 2?   S29   YES → SET CHARACTERISTIC NUMBER TO N   S30

NO

ADVANCE SCANNING POINTER p BY ONE CHARACTER   S25

E

PROCESSING FLOW FOR CHARACTERISTIC EXTRACTION UNIT

Fig. 5

LOOKING TOWARD TO THIS EVENING (* ⌒ O ⌒ *)

81
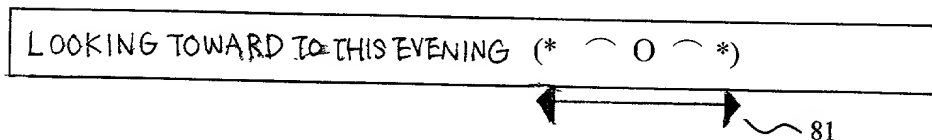
EXAMPLE OF TEXT DATA PASSED OVER TO READING ASSIGNMENT UNIT

```
                                    92              91
                          cnt
              ┌─────────────────────────────────────┐
              │   (*    ^    O    ^    *)            │
              └─────────────────────────────────────┘
         93        ↑                    ↑      94
              └──ps                    pe └──
```
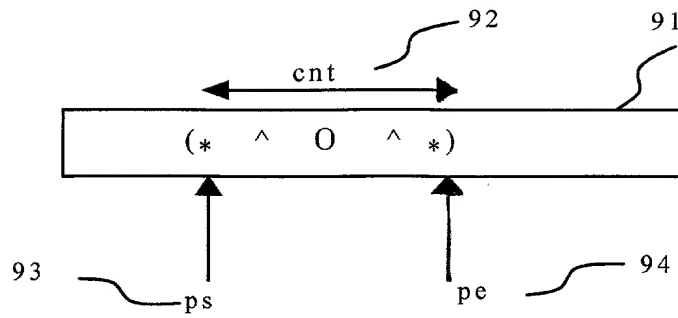
EXAMPLE OUTPUT OF FACIAL CHARACTER DETERMINING UNIT

Fig. 7

```
┌─────────────────────────────────────────────────────────┐
│                    TEXT BUFFER                           │  117
└─────────────────────────────────────────────────────────┘
           ↕                ↕                    ↕

                    ┌──────────────────────────┐   118
                    │  FREQUENCY VECTOR BUFFER  │
                    └──────────────────────────┘
                              ↕              ↕

  119     ┌───────────┐ 111      ┌──────────────┐ 112    ┌───────────┐ 113
TEXT  →   │ FACIAL    │   120    │CHARACTERISTIC│        │ READING   │      121
DATA      │ CHARACTER │ →OUTLINE │ EXTRACTION   │  →     │ SELECTION │  →  READING
          │DETERMINING│  POSITION│ UNIT         │        │ UNIT      │     &
          │ UNIT      │  DATA    │              │        │           │     FACIAL
          └───────────┘          └──────────────┘        └───────────┘     CHARACTER
                ↑                       ↑          FREQUENCY    ↑           POSITION
                                                  VECTOR                   DATA
             ( 114 )                 ( 115 )      ADDRESS    ( 116 )
          OUTLINE              CHARACTERISTIC     &          VECTOR TABLE
          SYMBOL TABLE         SYMBOL TABLE       OUTLINE
                                                  POSITION
                                                  DATA
```
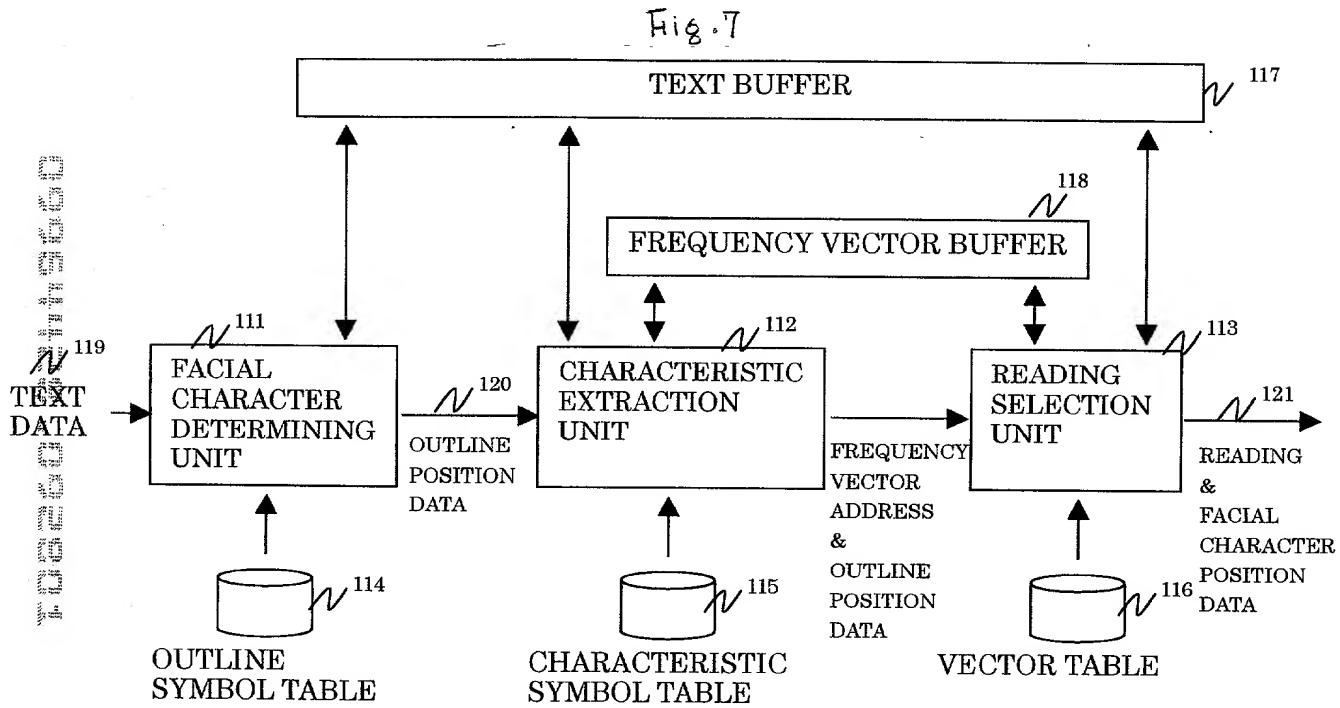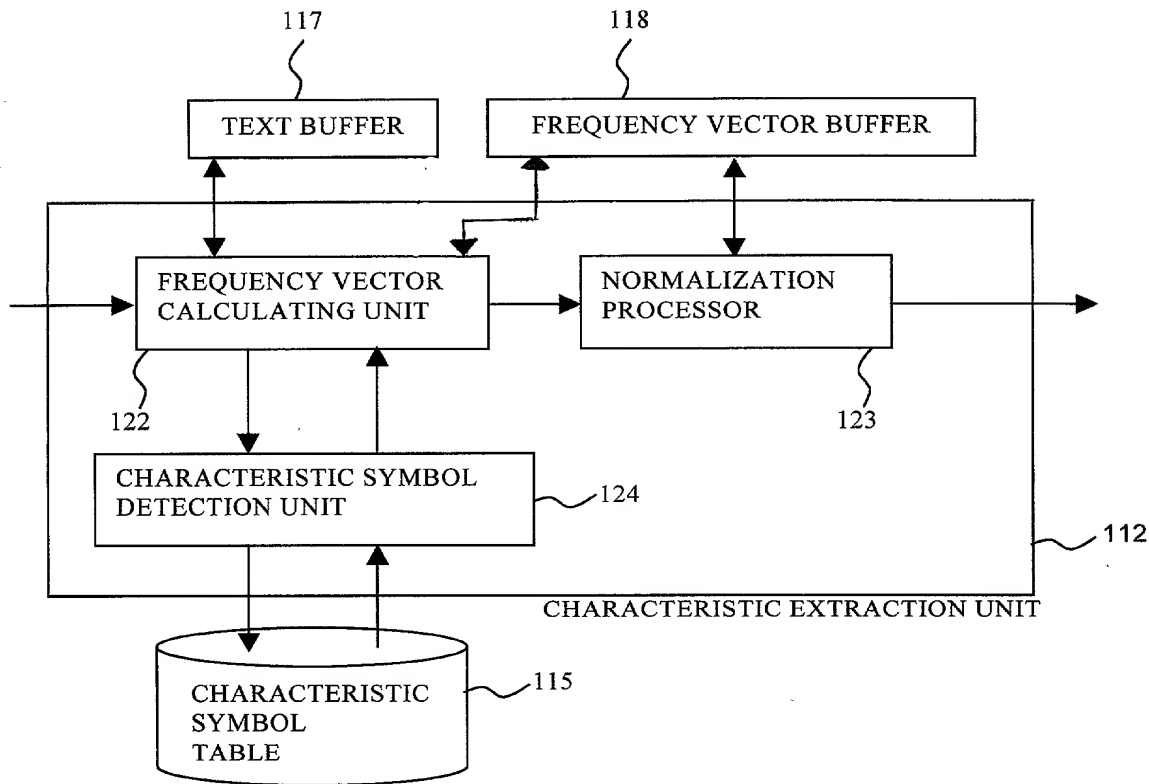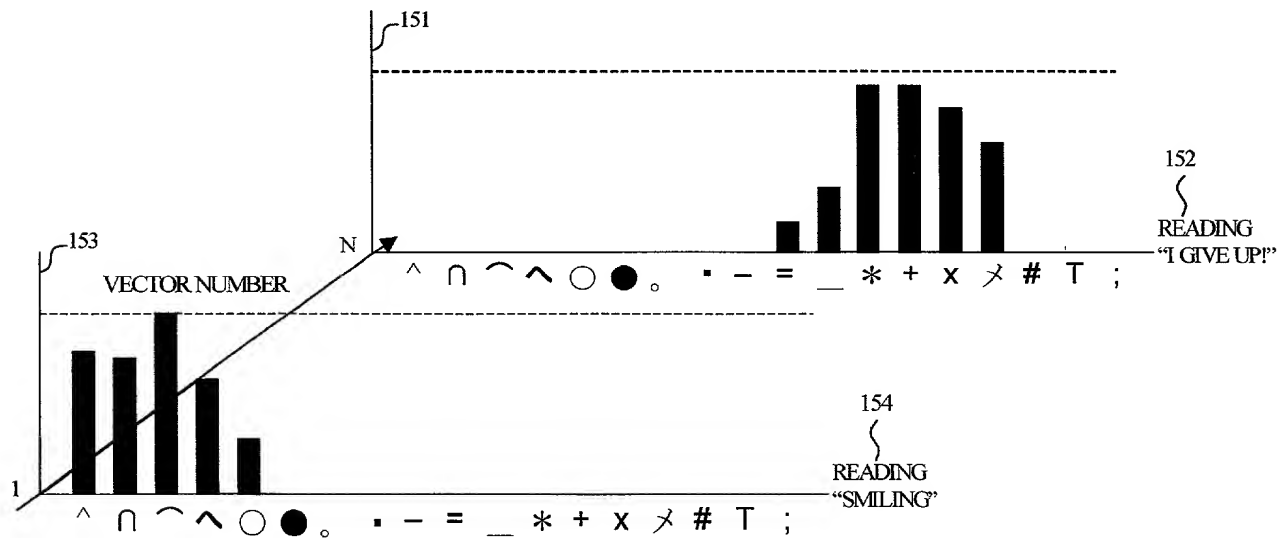
VIEW OF CONFIGURATION OF FACIAL CHARABTER READING ASSIGNMENT UNIT OF
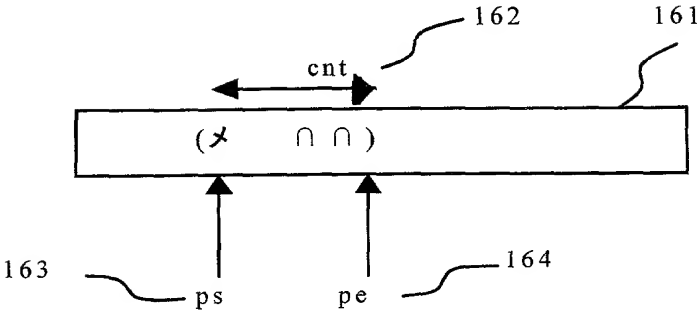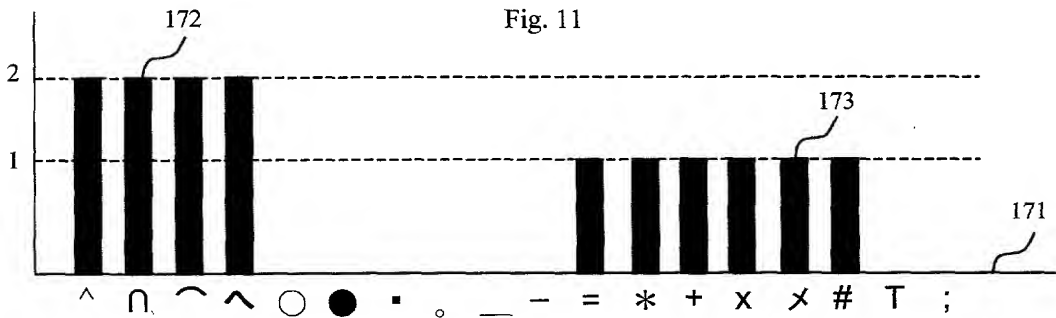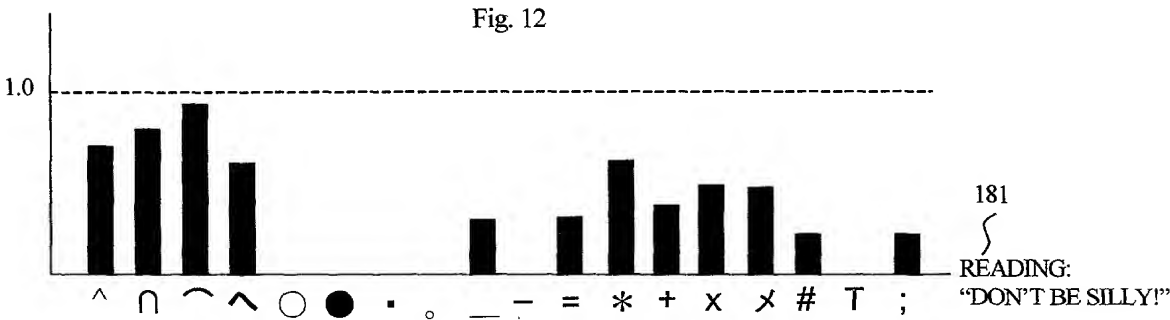THE SECOND EMBODIMENT

Fig. 8

117

118

| TEXT BUFFER | FREQUENCY VECTOR BUFFER |

FREQUENCY VECTOR
CALCULATING UNIT

NORMALIZATION
PROCESSOR

122

123

CHARACTERISTIC SYMBOL
DETECTION UNIT

124

112

CHARACTERISTIC EXTRACTION UNIT

CHARACTERISTIC
SYMBOL
TABLE

115

VIEW OF CONFIGURATION OF CHARACTERISTIC EXTRACTION UNIT

Fig. 9

151

152

READING
"I GIVE UP!"

153

VECTOR NUMBER

N

^ ∩ ⌒ ∧ ○ ● 。 ▪ — = ＿ ＊ ＋ x ⟋ # T ;

154

READING
"SMILING"

1

^ ∩ ⌒ ∧ ○ ● 。 ▪ — = ＿ ＊ ＋ x ⟋ # T ;

OUTLINE OF VECTOR TABLE

162

161

cnt

(✗   ∩ ∩)

163   ps   pe   164

EXAMPLE OF RESULTS OF FACIAL CHARACTER DETERMINATION

Fig. 11

172

173

171

2

1

^ ∩ ⌒ ⌒ ○ ● · ∘ __ — = ∗ + x ✗ # T ;

EXAMPLE OF FREQUENCY VECTORS

Fig. 12

1.0

181

READING:
"DON'T BE SILLY!"

^ ∩ ⌒ ⌒ ○ ● · ∘ __ — = ∗ + x ✗ # T ;

EXAMPLE OF SELECTED TYPICAL VECTORS

TEXT BUFFER   197

FREQUENCY VECTOR BUFFER   198

TEXT   199
DATA

FACIAL   191
CHARACTER
DETERMINING
UNIT

OUTLINE   200
POSITION
DATA

CHARACTERISTIC   192
EXTRACTION
UNIT

FREQUENCY
VECTOR
ADDRESS
&
OUTLINE
POSITION
DATA

READING   193
SELECTION
UNIT

READING   201
&
FACIAL
CHARACTER
POSITION
DATA

OUTLINE   194
SYMBOL TABLE

CHARACTERISTIC   195
SYMBOL TABLE
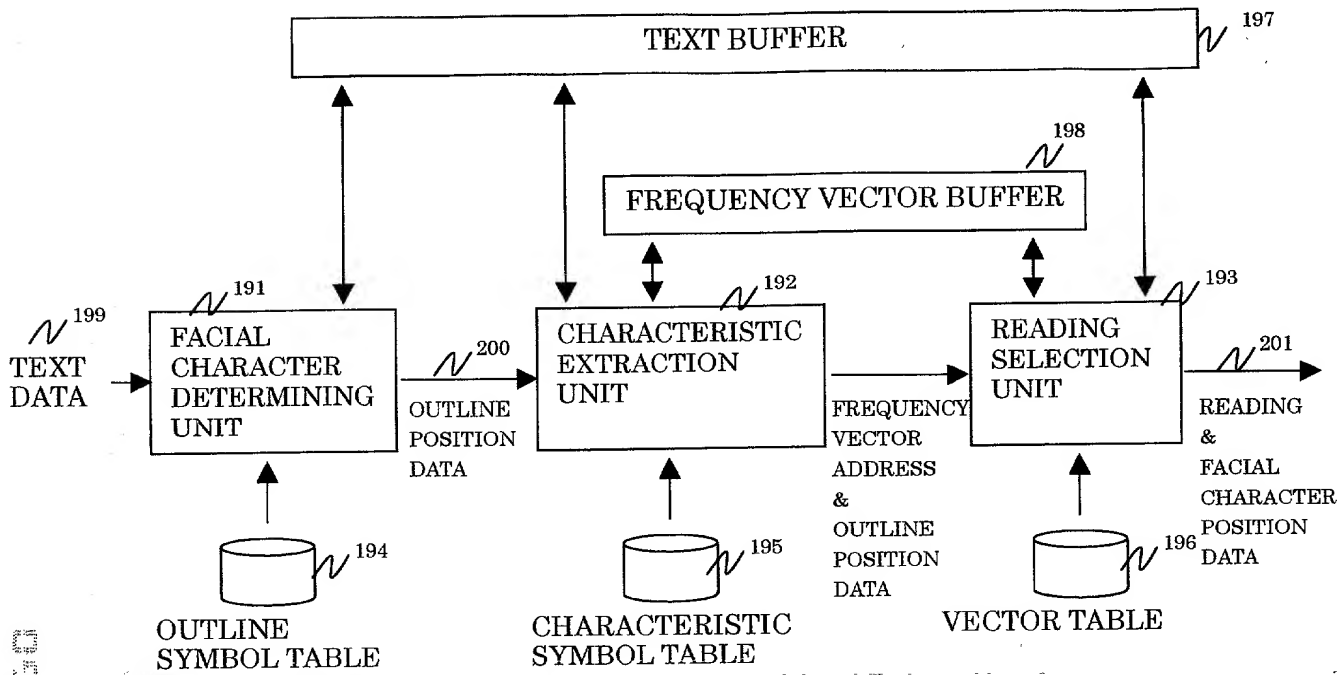
VECTOR TABLE   196

VIEW OF CONFIGURATION OF FACIAL CHARACTER READING ASSIGNMENT UNIT OF
THIRD EMBODIMENT

Fig. 14

TEXT BUFFER   197

FREQUENCY VECTOR BUFFER   198

FREQUENCY VECTOR
CALCULATING UNIT

FILTER

NORMALIZATION
PROCESSOR

202

203

204

CHARACTERISTIC SYMBOL
DETECTION UNIT   205

CHARACTERISTIC EXTRACTION UNIT   192

CHARACTERISTIC
SYMBOL
TABLE
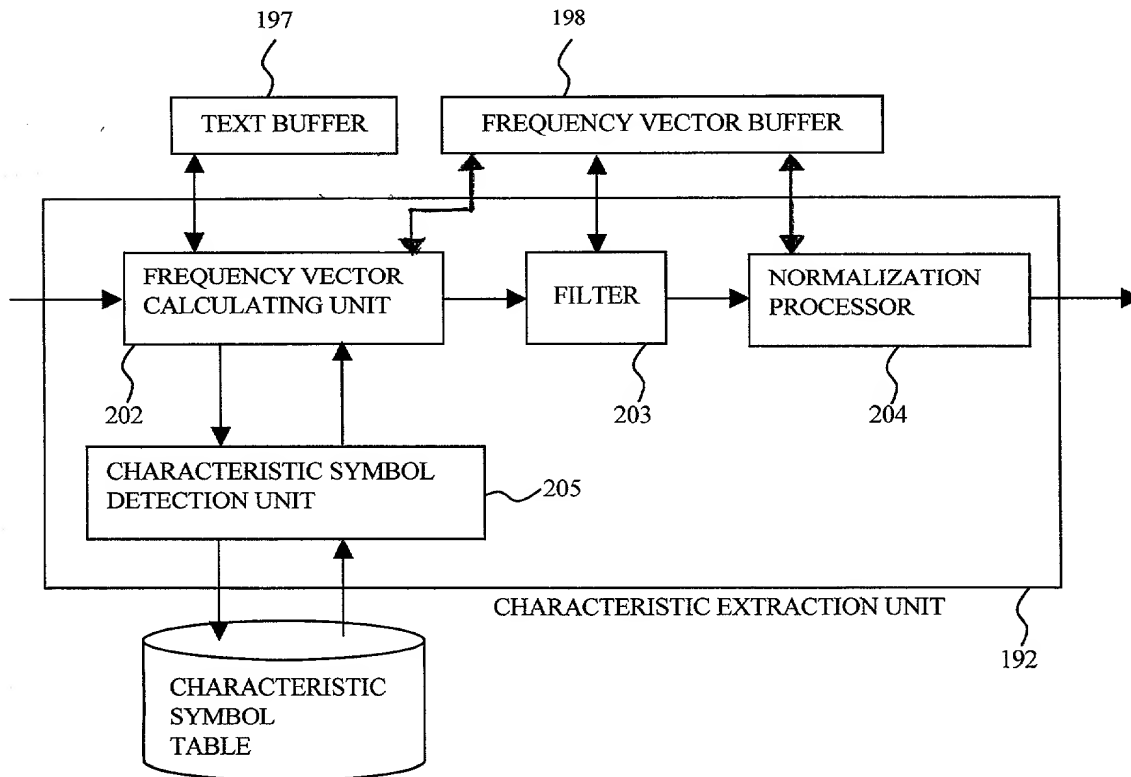
VIEW OF CONFIGURATION OF CHARACTERISTIC EXTRACTION UNIT
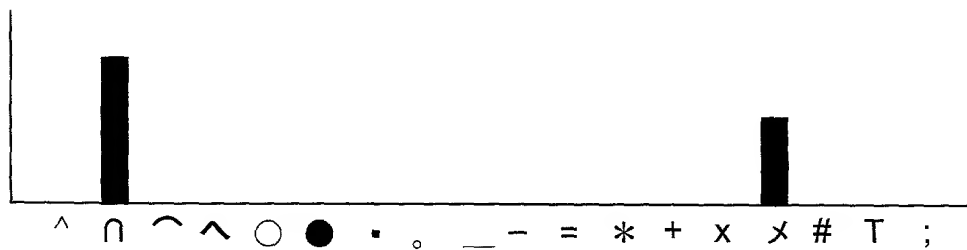
Fig. 15
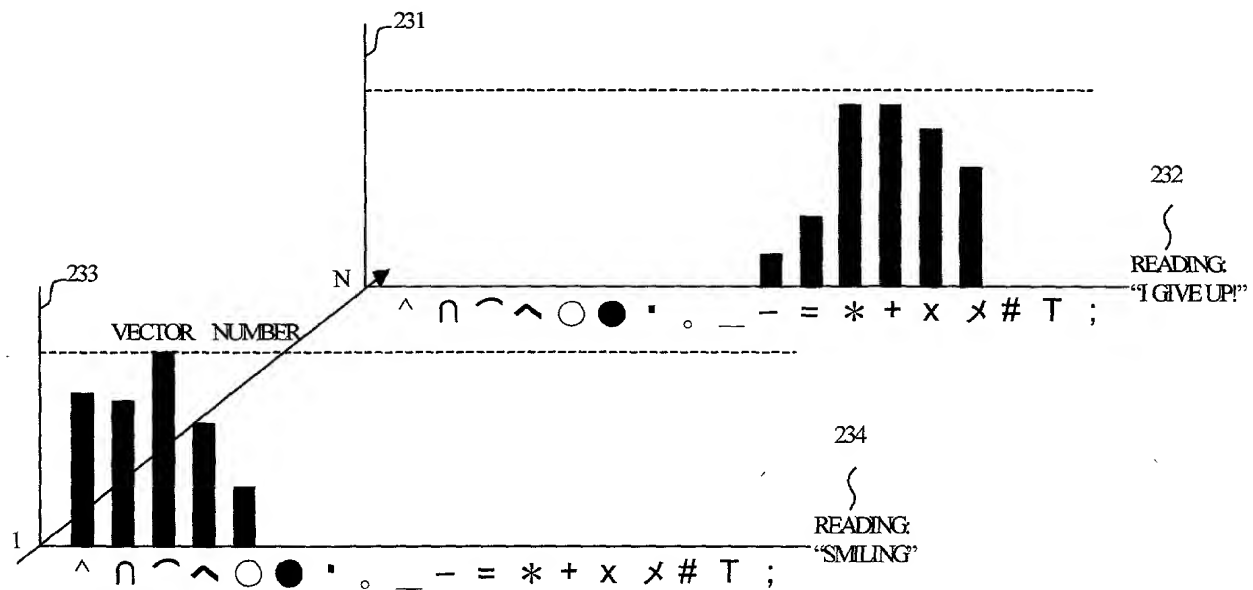
EXAMPLE VECTOR TABLE

Fig. 16
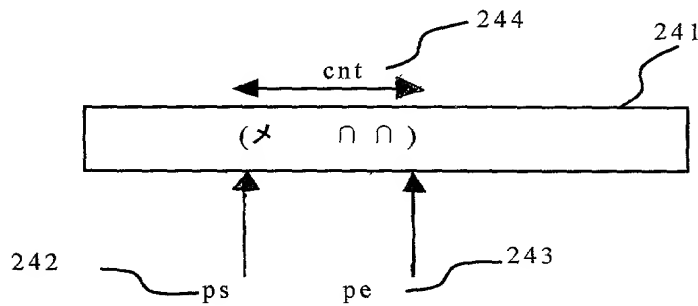
EXAMPLE OF FACIAL CHARACTER DETERMINATION PROCESSING RESULTS

Fig. 17

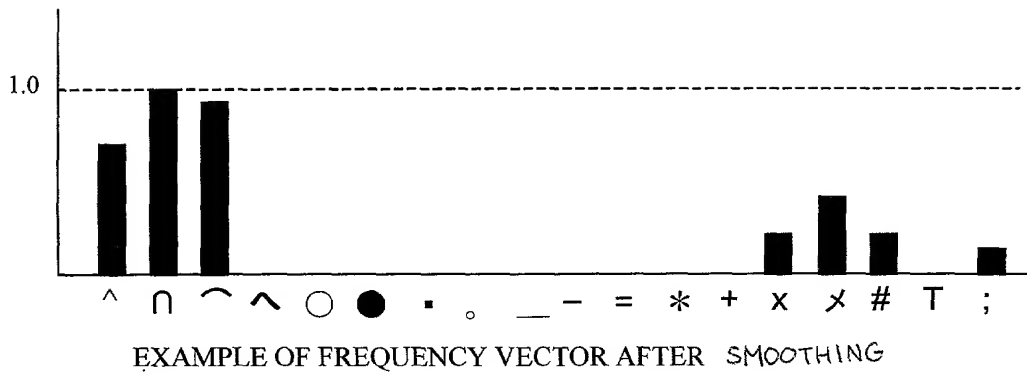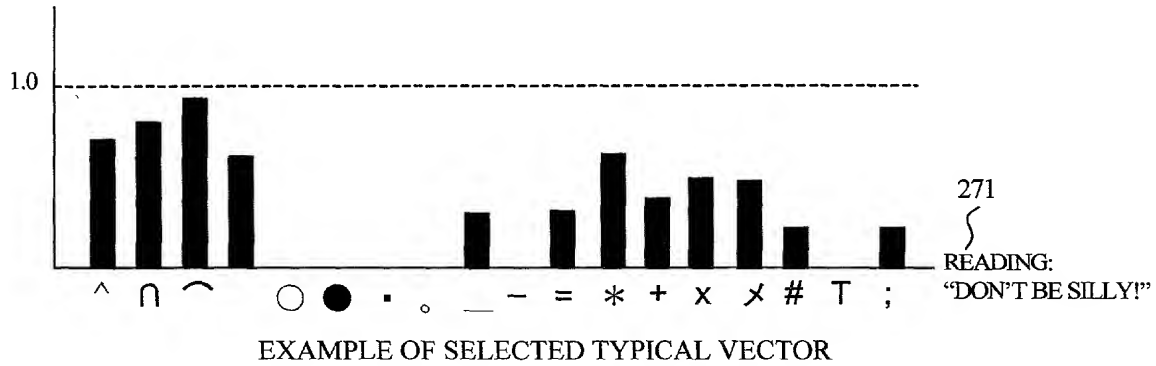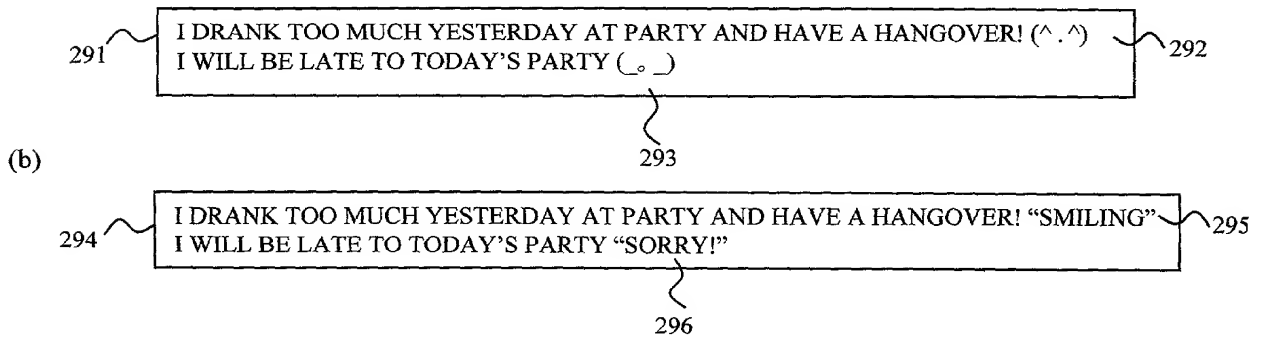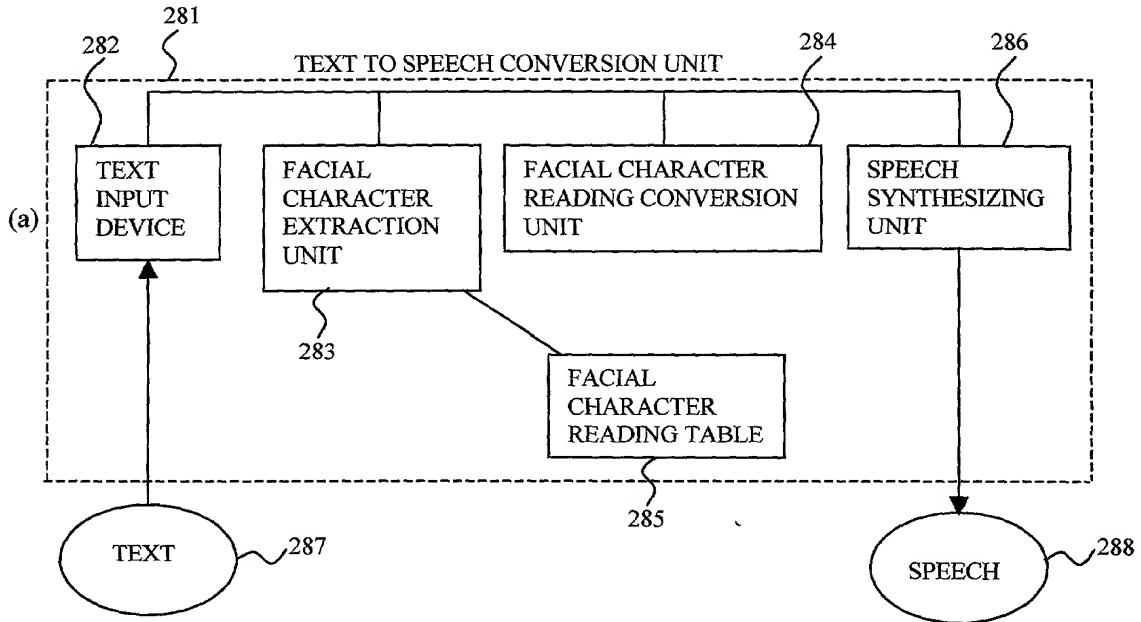EXAMPLE OF FREQUENCY VECTOR

Fig. 18

EXAMPLE OF FREQUENCY VECTOR AFTER SMOOTHING

Fig. 19

271

READING:
"DON'T BE SILLY!"

EXAMPLE OF SELECTED TYPICAL VECTOR

281
282   284   286

TEXT TO SPEECH CONVERSION UNIT

(a)

| TEXT INPUT DEVICE | FACIAL CHARACTER EXTRACTION UNIT | FACIAL CHARACTER READING CONVERSION UNIT | SPEECH SYNTHESIZING UNIT |

283

FACIAL CHARACTER READING TABLE

285

TEXT   287   SPEECH   288

(b)

291 | I DRANK TOO MUCH YESTERDAY AT PARTY AND HAVE A HANGOVER! (^ . ^) | 292
      I WILL BE LATE TO TODAY'S PARTY (_。_)

293

294 | I DRANK TOO MUCH YESTERDAY AT PARTY AND HAVE A HANGOVER! "SMILING" | 295
      I WILL BE LATE TO TODAY'S PARTY "SORRY!"

296

VIEW DESCRIBING RELATED ART